

INSTALLATION MANUAL

R-410A AFFINITY SERIES

BHZ024-060

2-5 Ton

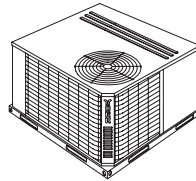


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General

YORK® Affinity Model BHZ units are factory assembled heat pumps designed for outdoor installation on a roof top or a slab. Field-installed electric heater accessories are available to provide supplemental electric heat combined with electric cooling and heating.

The units are completely assembled on rigid, removable base rails. All piping, refrigerant charge, and electrical wiring is factory installed and tested. The units require only electric power and duct connections at the point of installation.

The electric heaters have nickel-chrome resistance wire elements and utilize single point power connection.

Safety Considerations

This is a safety alert symbol ▲. When you see this symbol on labels or in manuals, be alert to the potential for personal injury.

Understand and pay particular attention the signal words **DANGER**, **WARNING** or **CAUTION**.

DANGER indicates an **imminently** hazardous situation, which, if not avoided, **will result in death or serious injury**.

WARNING indicates a **potentially** hazardous situation, which, if not avoided, **could result in death or serious injury**.

CAUTION indicates a potentially hazardous situation, which, if not avoided **may result in minor or moderate injury**. It is also used to alert against unsafe practices and hazards involving only property damage.

▲ WARNING

Improper installation may create a condition where the operation of the product could cause personal injury or property damage. Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual for assistance or for additional information, consult a qualified contractor, installer or service agency.

⚠ CAUTION

This product must be installed in strict compliance with the installation instructions and any applicable local, state and national codes including, but not limited to building, electrical, and mechanical codes.

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury. Improper installation, adjustment, alteration, service or maintenance can cause injury or property damage. Refer to this manual. For assistance or additional information consult a qualified installer or service agency.

⚠ CAUTION

This system uses R-410A Refrigerant which operates at higher pressures than R-22. No other refrigerant may be used in this system. Gage sets, hoses, refrigerant containers and recovery systems must be designed to handle R-410A. If you are unsure, consult the equipment manufacturer. Failure to use R-410A compatible servicing equipment may result in property damage or injury.

Due to system pressure, moving parts, and electrical components, installation and servicing of air conditioning equipment can be hazardous. Only qualified, trained service personnel should install, repair, or service this equipment. Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters.

Observe all precautions in the literature, labels, and tags accompanying the equipment whenever working on air conditioning equipment. Be sure to follow all other applicable safety precautions and codes including.

Wear safety glasses and work gloves. Use quenching cloth and have a fire extinguisher available during brazing operations.

Inspection

As soon as a unit is received, it should be inspected for possible damage during transit. If damage is evident, the extent of the damage should be noted on the carrier's freight bill. A separate request for inspection by the carrier's agent should be made in writing.

Reference

Additional information is available in the following reference forms:

- Technical Guide - BHZ024-060, 278726
- General Installation - BHZ024-060, 268721
- Electric Heat Accessory - 035-16605-003-E-0705

Renewal Parts

Contact your local York® parts distribution center for authorized replacement parts.

⚠ CAUTION

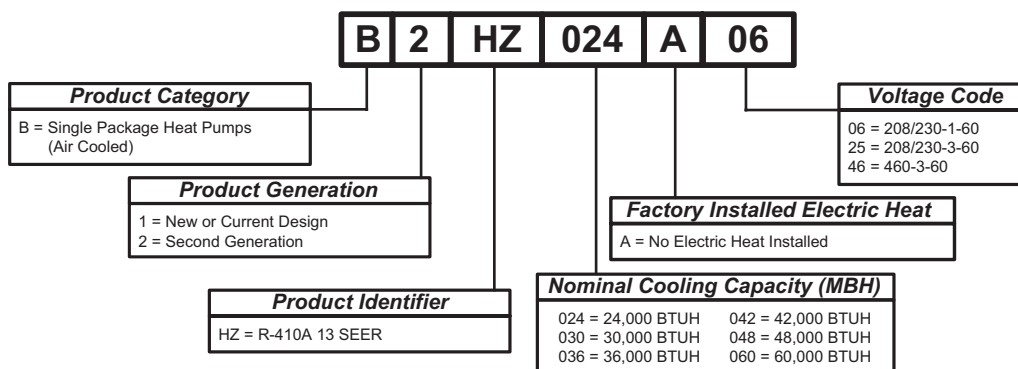
This product must be installed in strict compliance with the enclosed installation instructions and any applicable local, state, and national codes including, but not limited to, building, electrical, and mechanical codes.

⚠ WARNING

Improper installation may create a condition where the operation of the product could cause personal injury or property damage.

⚠ CAUTION

This system uses R-410A Refrigerant which operates at higher pressures than R-22. No other refrigerant may be used in this system.

Nomenclature

Installation

Limitations

These units must be installed in accordance with the following national and local safety codes.

1. National Electrical Code ANSI/NFPA No. 70 or Canadian Electrical Code Part 1, C22.1 (latest editions).
2. Local plumbing and waste water codes and other applicable local codes.

Refer to Table 6 for unit physical data and to Table 5 for electrical data.

If components are to be added to a unit to meet local codes, they are to be installed at the dealer's and/or the customer's expense.

Size of unit for proposed installation should be based on heat loss/heat gain calculations made in accordance with industry recognized procedures identified by the Air Conditioning Contractors of America.

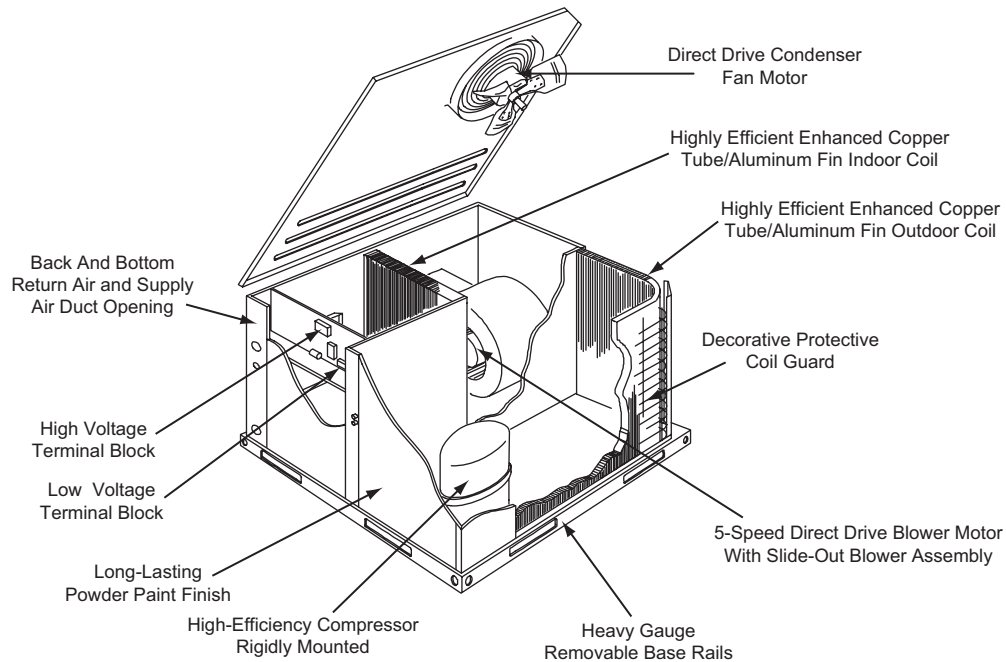


Figure 1: Component Location

Table 1: Unit Limitations

Size (Tons)	Unit Voltage	Unit Limitations		
		Applied Voltage		Outdoor DB Temp Max (°F)
		Min	Max	
024 (2.0)	208/230-1-60	187	252	125
030 (2.5)	208/230-1-60	187	252	125
	208/230-3-60	187	252	125
	460-3-60	432	504	125
036 (3.0)	208/230-1-60	187	252	125
	208/230-3-60	187	252	125
	460-3-60	432	504	125
042 (3.5)	208/230-1-60	187	252	125
	208/230-3-60	187	252	125
	460-3-60	432	504	125
048 (4.0)	208/230-1-60	187	252	125
	208/230-3-60	187	252	125
	460-3-60	432	504	125
060 (5.0)	208/230-1-60	187	252	125
	208/230-3-60	187	252	125
	460-3-60	432	504	125

Location

Use the following guidelines to select a suitable location for these units.

1. Unit is designed for outdoor installation only.
2. Condenser must have an unlimited supply of air. Where a choice of location is possible, position unit on either north or east side of building.
3. For ground level installation, a level pad or slab should be used. The thickness and size of the pad or slab used should meet local codes and unit weight. Do not tie the slab to the building foundation.
4. For roof top installation, be sure the structure can support the weight of the unit plus any field installed components. Unit must be installed on a level roof curb or appropriate angle iron frame providing adequate support under the compressor/condenser section.
5. Maintain level tolerance of unit to 1/8" maximum.

WARNING

Do not permit overhanging structures or shrubs to obstruct condenser air discharge outlet, combustion air inlet or vent outlets.

Clearances

All units require certain clearances for proper operation and service. Refer to Table 4 for the clearances required for construction, servicing and proper unit operation.

Rigging And Handling

Exercise care when moving the unit. Do not remove any packaging until the unit is near the place of installation. Rig the unit by attaching chain or cable slings to the lifting holes provided in the base rails. Spreader bars, whose length exceeds the largest dimension across the unit, **MUST** be used across the top of the unit.

CAUTION

If a unit is to be installed on a roof curb other than a York® roof curb, gasketing must be applied to all surfaces that come in contact with the unit underside.

CAUTION

Before lifting, make sure the unit weight is distributed equally on the rigging cables so it will lift evenly.

Units may be moved or lifted with a forklift. Slotted openings in the base rails are provided for this purpose.

CAUTION

All panels must be secured in place when the unit is lifted.

The condenser coils should be protected from rigging cable damage with plywood or other suitable material.

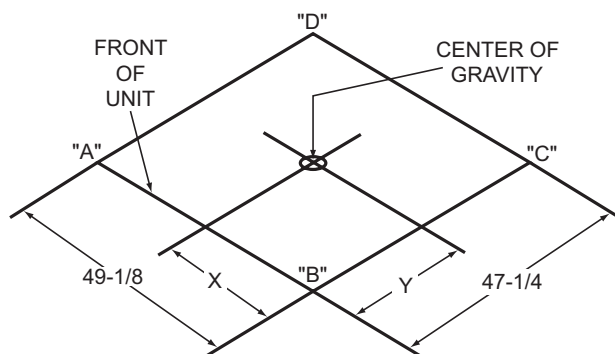


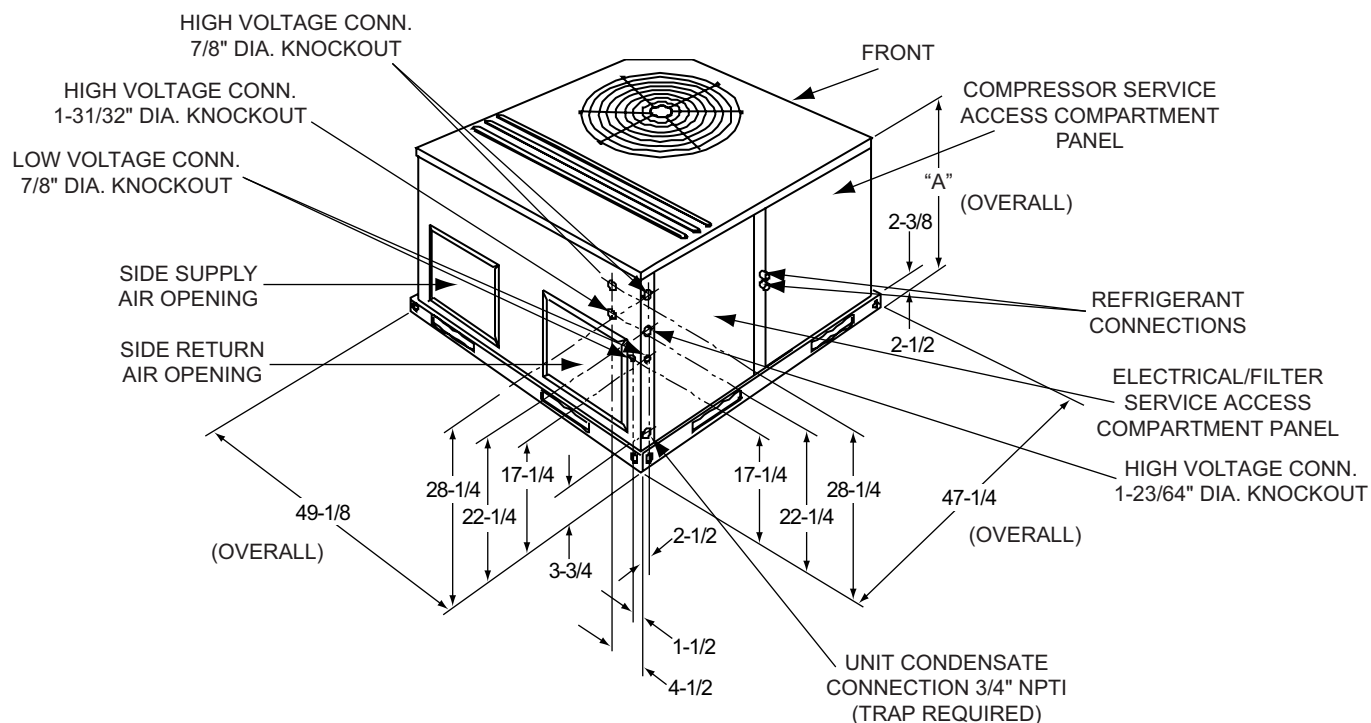
Figure 2: Unit 4 Point Load Weight

Size (Tons)	Weight (lbs.)		Center of Gravity		4 Point Load Location (lbs.)			
	Shipping	Operating	X	Y	A	B	C	D
024 (2.0)	360	355	22.25	25	96	84	81	93
030 (2.5)	355	350	22.25	25	96	84	81	93
036 (3.0)	395	390	22.25	25	106	92	89	102
042 (3.5)	445	440	22.25	25	120	104	101	115
048 (4.0)	490	485	22.25	25	132	115	111	127
060 (5.0)	500	495	22.25	25	135	117	113	130

Table 2: Unit Accessory Weights

Unit Accessory	Model	Weight (lbs.)	
		Shipping	Operating
Add Economizer	All	45	40
Add Electric Heat ¹	All	13	12

1. Weight given is for the maximum heater size available (25 kW).

**Figure 3: Unit Dimensions****Table 3: Unit Dimensions Front**

Unit Size	Dimensions
	"A"
024, 030, 036	33-1/2
042, 048, 060	41-1/2

Table 4: Unit Clearances

Direction	Distance (in.)	Direction	Distance (in.)
Top ¹	36	Right	24
Front	12	Left	24
Rear	0	Bottom ^{2 3}	0

- Units must be installed outdoors. Over hanging structure or shrubs should not obscure condenser air discharge outlet.
- Units may be installed on combustible floors made from wood or class A, B or C roof covering materials.
- Minimum Clearance of 1 inch all sides of supply air duct for the first 3 foot of duct for 20 & 25 kW., zero inches there after. For all other heaters, zero inch clearance all sides for entire length of duct.

Note: For units applied with a roof curb, the minimum clearance may be reduced from 1 inch to 1/2 inch between combustible roof curb material and this supply air duct.

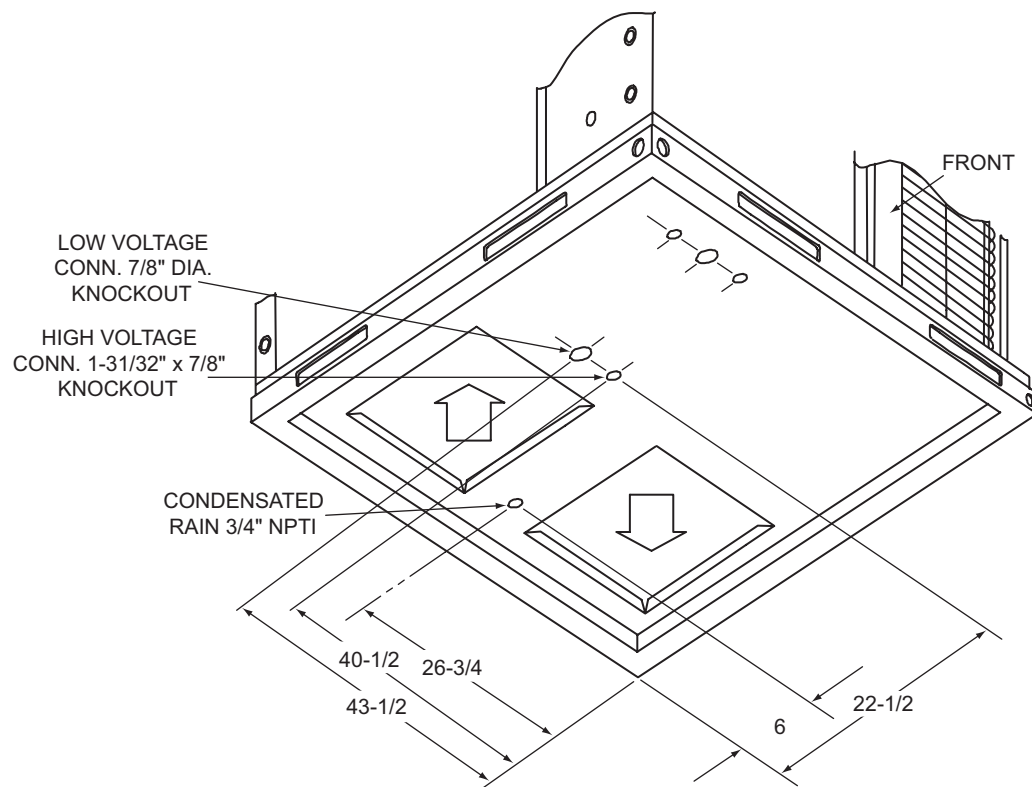


Figure 4: Dimensions Front and Bottom

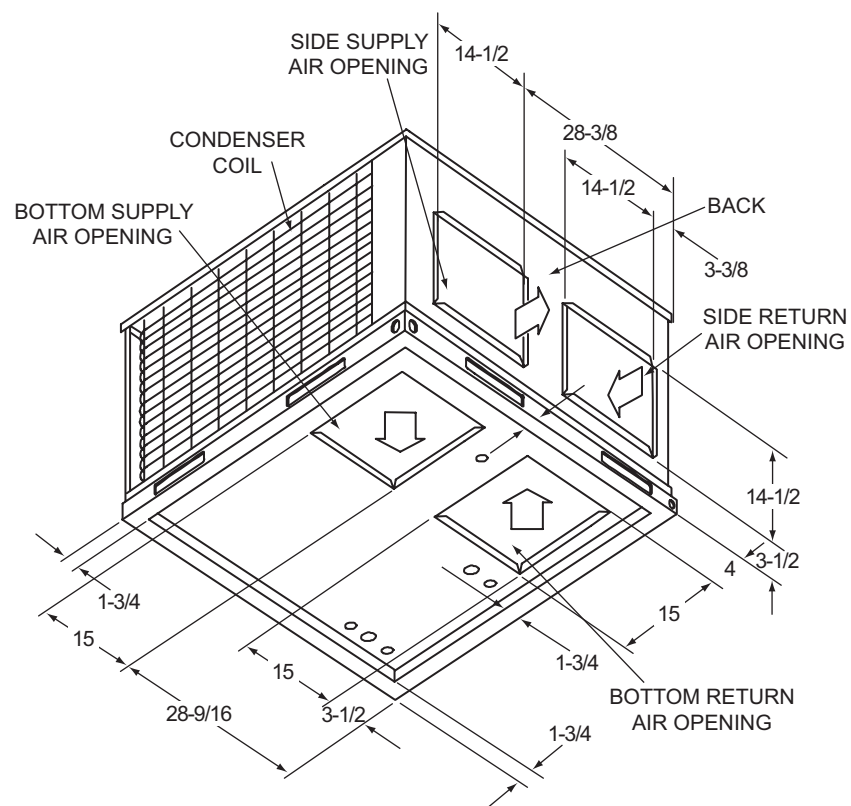


Figure 5: Dimensions Back and Bottom

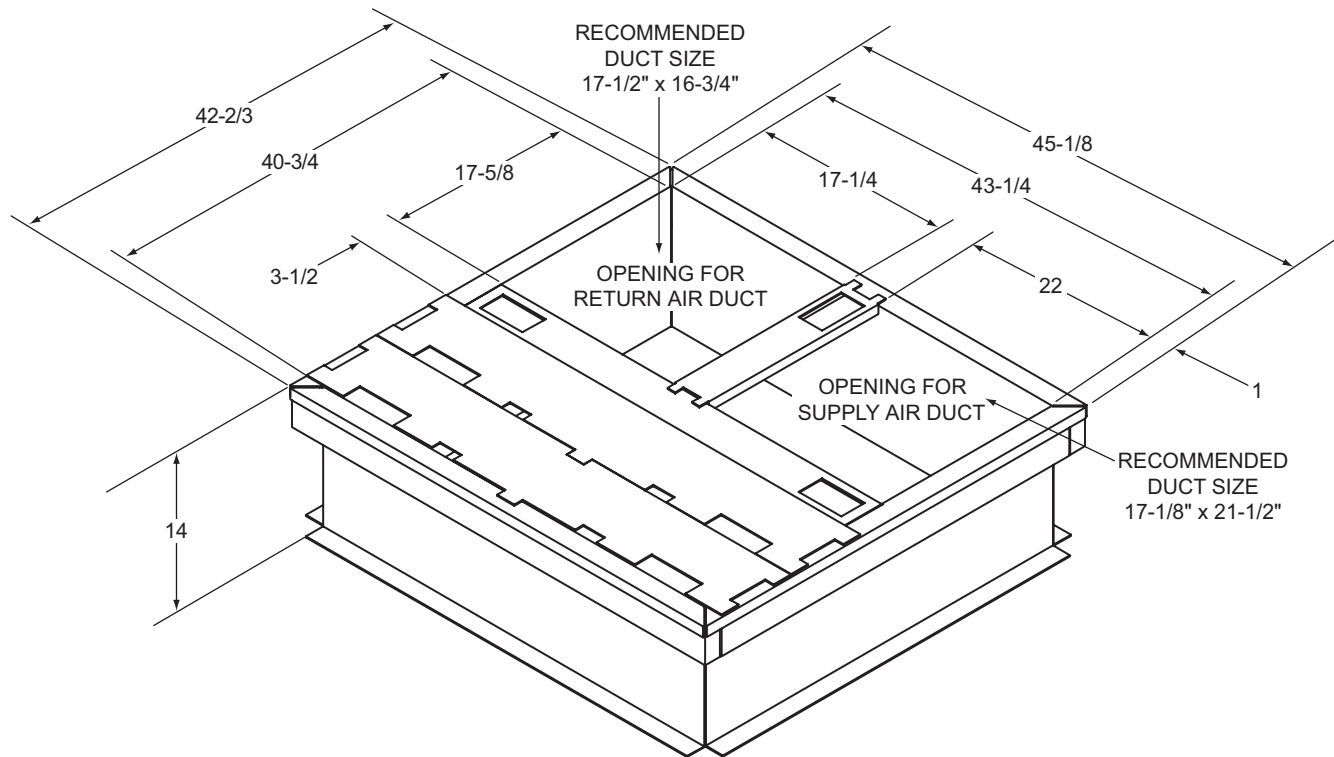


Figure 6: Roof Curb¹

Ductwork

These units are adaptable to downflow use as well as rear supply and return air duct openings. To convert to downflow, use the following steps:

1. Remove the duct covers found in the bottom return and supply air duct openings. There are four (4) screws securing each duct cover (save these screws to use in Step 2).
2. Install the duct covers (removed in step one) to the rear supply and return air duct openings. Secure with the four (4) screws used in step one.
3. Seal duct covers with silicone caulk.

Duct work should be designed and sized according to the methods of the Air Conditioning Contractors of America (ACCA), as set forth in their Manual D.

A closed return duct system shall be used. This shall not preclude use of economizers or ventilation air intake. Flexible joints may be used in the supply and return duct work to minimize the transmission of noise.

CAUTION

When fastening duct work to the side duct flanges on the unit, insert the screws through the duct flanges only. DO NOT insert the screws through the casing. Outdoor duct work must be insulated and waterproofed.

¹. 8" Roof Curb also available.

NOTE: Be sure to note supply and return openings.

Refer to Figures 4 and 5 for information concerning rear and bottom supply and return air duct openings.

Roof Curb

On applications when a roof curb is used, the unit must be positioned on the curb so the front of the unit is tight against the curb.

Filters

Single phase units are shipped without a filter or filter racks. It is the responsibility of the installer to secure a filter in the return air ductwork or install a Filter/Frame Kit (1FF0114).

A filter rack and high velocity filters are standard on three phase units.

Filters must always be used and must be kept clean. When filters become dirt laden, insufficient air will be delivered by the blower, decreasing your units efficiency and increasing operating costs and wear-and-tear on the unit and controls.

Filters should be checked monthly; this is especially important since this unit is used for both heating and cooling.

Condensate Drain

A condensate trap is recommended to be installed in the condensate drain. The plumbing must conform to local codes.

Use a sealing compound on male pipe threads. Install the condensate drain line (3/4" NPTF) to spill into an open drain.

Service Access

Access to all serviceable components is provided at the following locations:

- Blower compartment access panel
- Electrical/Filter access panel
- Compressor access panel
- Refrigerant connections

Refer to Figures 1 and 3 for location of these access locations and minimum clearances in Table 4.

CAUTION

This system uses R-410A Refrigerant which operates at higher pressures than R-22. No other refrigerant may be used in this system. Gage sets, hoses, refrigerant containers and recovery systems must be designed to handle R-410A. If you are unsure, consult the equipment manufacturer. Failure to use R-410A compatible servicing equipment may result in property damage or injury.

WARNING

Wear safety glasses and gloves when handling refrigerants. Failure to follow this warning can cause serious personal injury.

Refer to Figure 9 for the R-410A quick reference guide.

Thermostat

The room thermostat should be located on an inside wall approximately 56" above the floor where it will not be subject to drafts, sun exposure or heat from electrical fixtures or appliances. Follow manufacturer's instructions enclosed with the thermostat for general installation procedure. Four color coded insulated wires (minimum #18 AWG) should be used to connect thermostat to unit. See Figure 7.

Power And Control Wiring

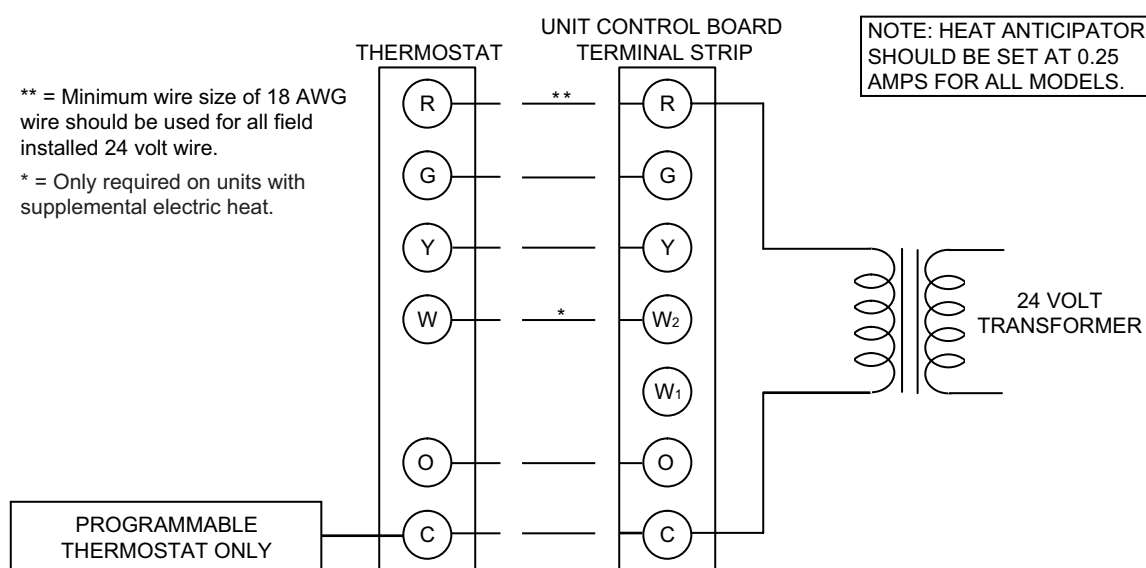
Field wiring to the unit must conform to provisions of the current N.E.C. ANSI/NFPA No. 70 or C.E.C. and/or local ordinances. The unit must be electrically grounded in accordance with local codes or, in their absence, with the N.E.C./C.E.C. Voltage tolerances which must be maintained at the compressor terminals during starting and running conditions are indicated on the unit Rating Plate and Table 5.

The wiring entering the cabinet must be provided with mechanical strain relief.

A fused disconnect switch should be field provided for the unit. If any of the wire supplied with the unit must be replaced, replacement wire must be of the type shown on the wiring diagram.

Electrical line must be sized properly to carry the load. Each unit must be wired with a separate branch circuit fed directly from the meter panel and properly fused.

Refer to Figures 7 and 8 for typical field wiring and to the appropriate unit wiring diagram for control circuit and power wiring information.



CAUTION: Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.

Figure 7: Typical Field Control Wiring Diagram

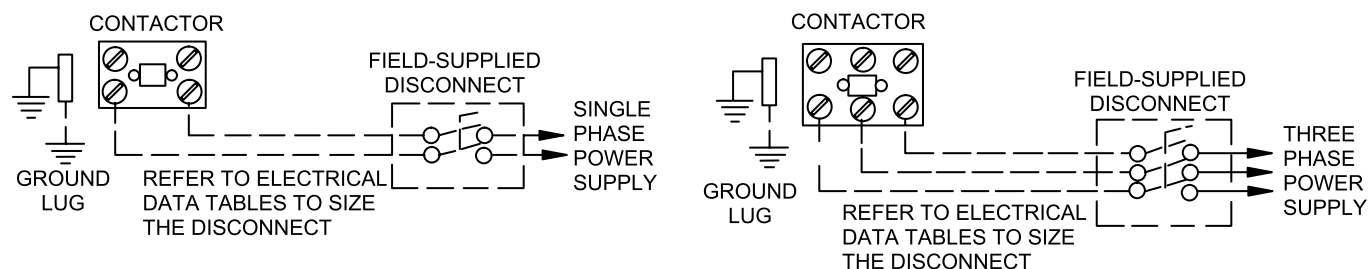


Figure 8: Typical Field Power Wiring Diagram

Table 5: Electrical Data

Size (Tons)	Volt	Compressors (each)			OD Fan Motors (each)	Supply Blower Motor	Electric Heat Option				MCA ¹ (Amps)	Max Fuse ² / Breaker ³ Size (Amps)
		RLA	LRA	MCC			FLA	FLA	Model	kW		
024 (2.0)	208/230-1-60	12.8	60	20	1.2	4.1	None	-	-	-	21.3	30
							2NH04500506	3.8 / 5	1	18.1 / 20.8	43.9 / 47.3	50 / 50
							2NH04500706	5.6 / 7.5	2	27.1 / 31.3	55.2 / 60.4	60 / 70
							2NH04501006	7.5 / 10	2	36.1 / 41.7	66.4 / 73.4	70 / 80
030 (2.5)	208/230-1-60	14.7	73	23	1.2	4.1	None	-	-	-	23.7	30
							2NH04500506	3.8 / 5	1	18.1 / 20.8	46.2 / 49.7	50 / 50
							2NH04500706	5.6 / 7.5	2	27.1 / 31.3	57.5 / 62.7	60 / 70
							2NH04501006	7.5 / 10	2	36.1 / 41.7	68.8 / 75.8	70 / 80
	208/230-3-60	10.4	60	16	0.8	4.1	2NH04501506	11.3 / 15	2	54.2 / 62.5	91.4 / 101.8	100 / 110
							None	-	-	-	18.3	25
							2NH04501025	7.5 / 10	1	20.8 / 24.1	44.4 / 48.4	45 / 50
	460-3-60	4.5	31	7	0.8	2.1	2NH04501525	11.3 / 15	1	31.3 / 36.1	57.4 / 63.4	60 / 70
							None	-	-	-	8.5	15
							2NH04501046	10	1	12	23.5	25
036 (3.0)	208/230-1-60	15.4	83	24	1.2	6.0	2NH04501546	15	1	18	31	35
							None	-	-	-	26.5	35
							2NH04500506	3.8 / 5	1	18.1 / 20.8	49 / 52.5	50 / 60
							2NH04500706	5.6 / 7.5	2	27.1 / 31.3	60.3 / 65.5	70 / 70
	208/230-3-60	11.5	77	18	1.2	6.0	2NH04501006	7.5 / 10	2	36.1 / 41.7	71.6 / 78.5	80 / 80
							2NH04501506	11.3 / 15	2	54.2 / 62.5	94.2 / 104.6	100 / 110
							None	-	-	-	21.6	30
							2NH04501025	7.5 / 10	1	20.8 / 24.1	47.6 / 51.6	50 / 60
	460-3-60	5.1	35	8	0.8	3.0	2NH04501525	11.3 / 15	1	31.3 / 36.1	60.7 / 66.7	70 / 70
							None	-	-	-	10.1	15
							2NH04501046	10	1	12	25.2	30
042 (3.5)	208/230-1-60	18.6	105	29	1.2	6.0	2NH04501546	15	1	18	32.7	35
							None	-	-	-	30.5	40
							2NP04501006	7.5 / 10	2	36.1 / 41.7	75.6 / 82.5	80 / 90
							2NP04501506	11.3 / 15	2	54.2 / 62.5	98.2 / 108.6	100 / 110
	208/230-3-60	13.4	88	21	1.2	6.0	2ND04501506	3.8 / 5	1	18.1 / 20.8	53 / 56.5	60 / 60
							7.5 / 10	1	36.1 / 41.7	75.6 / 82.5	80 / 90	
							None	-	-	-	24	30
							2NP04501025	7.5 / 10	1	20.8 / 24.1	50 / 54	60 / 60
	460-3-60	6.4	39	10	0.8	3.0	2NP04501525	11.3 / 15	1	31.3 / 36.1	63 / 69.1	70 / 70
							None	-	-	-	11.8	15
							2NP04501046	10	1	12	26.8	30
048 (4.0)	208/230-1-60	21.1	113	33	1.2	6.0	2NP04501546	15	1	18	34.3	35
							None	-	-	-	33.6	45
							2NP04501006	7.5 / 10	2	36.1 / 41.7	78.7 / 85.7	90 / 90
							2NP04501506	11.3 / 15	2	54.2 / 62.5	101.3 / 111.7	110 / 125
	208/230-3-60	16.0	120	25	1.2	6.0	2NP04502006	15 / 20	2	72.2 / 83.3	123.9 / 137.7	125 / 150
							2NP04502506	18.8 / 25	2	90.3 / 104.2	146.4 / 163.8	150 / 175
							None	-	-	-	27.2	35
							2NP04501025	7.5 / 10	1	20.8 / 24.1	53.3 / 57.3	60 / 60
							2NP04501525	11.3 / 15	1	31.3 / 36.1	66.3 / 72.3	70 / 80
							2NP04502025	15 / 20	2	41.7 / 48.1	79.3 / 87.3	80 / 90
	460-3-60	8.3	60	13	0.8	3.0	2NP04502525	18.8 / 25	2	52.1 / 60.1	92.4 / 102.4	100 / 110
							None	-	-	-	14.1	20
							2NP04501046	10	1	12	29.2	30
							2NP04501546	15	1	18	36.7	40
							2NP04502046	20	2	24.1	44.2	45
							2NP04502546	25	2	30.1	51.8	60

Table 5: Electrical Data (Continued)

Size (Tons)	Volt	Compressors (each)			OD Fan Motors (each)	Supply Blower Motor	Electric Heat Option				MCA ¹ (Amps)	Max Fuse ² / Breaker ³ Size (Amps)
		RLA	LRA	MCC			Model	kW	Stages	Amps		
060 (5.0)	208/230-1-60	26.2	150	41	2.3	7.6	None	-	-	-	42.7	60
							2NP04501006	7.5 / 10	2	36.1 / 41.7	87.8 / 94.7	100 / 110
							2NP04501506	11.3 / 15	2	54.2 / 62.5	110.4 / 120.8	125 / 125
							2NH04502006	15 / 20	2	72.2 / 83.3	132.9 / 146.8	150 / 150
							2NP04502506	18.8 / 25	2	90.3 / 104.2	155.5 / 172.9	175 / 175
							None	-	-	-	32.3	40
	208/230-3-60	17.9	120	28	2.3	7.6	2NH04501025	7.5 / 10	1	20.8 / 24.1	58.3 / 62.3	70 / 70
							2NH04501525	11.3 / 15	1	31.3 / 36.1	71.4 / 77.4	80 / 80
							2NH04502025	15 / 20	2	41.7 / 48.1	84.4 / 92.4	90 / 100
							2NH04502525	18.8 / 25	2	52.1 / 60.1	97.4 / 107.5	100 / 110
							None	-	-	-	17.1	25
							2NP04501046	10	1	12	32.1	35
	460-3-60	9.6	70	15	1.3	3.8	2NH04501546	15	1	18	39.7	40
							2NH04502046	20	2	24.1	47.2	50
							2NP04502546	25	2	30.1	54.7	60
							None	-	-	-	17.1	25

1. Minimum Circuit Ampacity.
2. Maximum Over Current Protection per standard UL 1995.
3. Fuse or HACR circuit breaker size installed at factory or field installed.

Table 6: Physical Data

Component	Models					
	BHZ024	BHZ030	BHZ036	BHZ042	BHZ048	BHZ060
Nominal Tonnage	2.0	2.5	3.0	3.5	4.0	5.0
ARI COOLING PERFORMANCE						
Gross Capacity @ ARI A point (Btu)	22.9	29.7	36.0	41.3	47.2	57.5
ARI net capacity (Btu)	22.8	29.2	33.6	40.5	45.5	56.0
EER	11.4	11.25	11.0	11.25	10.65	11.0
SEER	13	13	13	13	13	13
Nominal CFM	800	950	1100	1400	1450	1550
System power (KW)	2.0	2.6	3.1	3.6	4.1	5.10
Refrigerant type	R410a	R410a	R410a	R410a	R410a	R410a
Refrigerant charge (lb-oz)	6-0	7-4	9-6	12-0	10-10	11-8
ARI HEATING PERFORMANCE						
47°F Capacity Rating (Mbh)	22.2	27.8	32.8	40.0	45.5	56.0
System Power (Kw/COP)	3.4	3.3	3.0	3.0	3.0	2.90
17°F Capacity Rating (Mbh)	11.5	14.6	19.2	23.2	27.4	33.0
System Power (Kw/COP)	2.0	2.0	2.3	2.3	2.2	2.0
HSPF (BTU/Watts-hr.)	7.7	7.7	7.7	7.7	7.7	7.7
DIMENSIONS (inches)						
Length	49 1/8	49 1/8	49 1/8	49 1/8	49 1/8	49 1/8
Width	47 1/4	47 1/4	47 1/4	47 1/4	47 1/4	47 1/4
Height	33 1/2	33 1/2	33 1/2	41 1/2	41 1/2	41 1/2
OPERATING WT. (lbs.)	350	350	385	435	480	490
COMPRESSORS						
Type	Scroll 1-spd	Scroll 1-spd	Scroll 1-spd	Scroll 1-spd	Scroll 1-spd	Scroll 1-spd
Quantity	1	1	1	1	1	1
CONDENSER COIL DATA						
Face area (Sq. Ft.)	11.7	11.7	11.7	16.4	16.4	16.4
Rows	1	1	2	2	2	2
Fins per inch	20	20	20	20	20	20
Tube diameter (in.)	3/8	3/8	3/8	3/8	3/8	3/8
Circuitry Type	Interlaced	Interlaced	Interlaced	Interlaced	Interlaced	Interlaced
Refrigerant control	Orifice	Orifice	Orifice	Orifice	Orifice	TXV
EVAPORATOR COIL DATA						
Face area (Sq. Ft.)	4.38	4.38	4.38	5.63	5.63	5.63
Rows	2	3	3	3	3	3
Fins per inch	15	13	15	15	16	16
Tube diameter	3/8	3/8	3/8	3/8	3/8	3/8
Circuitry Type	Interlaced	Interlaced	Interlaced	Interlaced	Interlaced	Interlaced
Refrigerant control	Orifice	Orifice	Orifice	Orifice	Orifice	TXV

Table 6: Physical Data (Continued)

Component	Models					
	BHZ024	BHZ030	BHZ036	BHZ042	BHZ048	BHZ060
Nominal Tonnage	2.0	2.5	3.0	3.5	4.0	5.0
CONDENSER FAN DATA						
Fan diameter (Inch)	22	22	22	22	22	22
Type	Prop	Prop	Prop	Prop	Prop	Prop
Drive type	Direct	Direct	Direct	Direct	Direct	Direct
No. speeds	1	1	1	1	1	1
Number of motors	1	1	1	1	1	1
Motor HP each	1/4	1/4	1/4	1/4	1/4	1/2
RPM	850	850	850	850	850	1100
Nominal total CFM	1800	1800	2400	2400	3000	3000
DIRECT DRIVE EVAP FAN DATA						
Quantity	1	1	1	1	1	1
Fan Size (Inch)	10 x 8	10 x 8	11 x 10	11 x 10	11 x 10	11 x 10
Type	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal	Centrifugal
No. speeds	5	5	5	5	5	5
Motor HP each	1/2	1/2	3/4	3/4	3/4	1
RPM	Variable	Variable	Variable	Variable	Variable	Variable
Frame size	48	48	48	48	48	48
FILTERS						
Quantity - Size	2 - 22 x 14 x 1	2 - 22 x 14 x 1	2 - 22 x 14 x 1	2 - 22 x 14 x 1	2 - 22 x 14 x 1	2 - 22 x 14 x 1

Compressors

The scroll compressor used in this product is specifically designed to operate with R-410A Refrigerant and cannot be interchanged.

CAUTION

This system uses R-410A Refrigerant which operates at higher pressures than R-22. No other refrigerant may be used in this system.

The compressor also uses a polyolester (POE oil), Mobil 3MA POE. This oil is extremely hydroscopic, meaning it absorbs water readily. POE oil can absorb 15 times as much water as other oils designed for HCFC and CFC refrigerants. Take all necessary precautions to avoid exposure of the oil to the atmosphere.

CAUTION

Do not leave the system open to the atmosphere. Unit damage could occur due to moisture being absorbed by the **POE oil** in the system. This type of oil is highly susceptible to moisture absorption

POE (polyolester) compressor lubricants are known to cause long term damage to some synthetic roofing materials.

CAUTION

Exposure, even if immediately cleaned up, may cause embrittlement (leading to cracking) to occur in one year or more. When performing any service that may risk exposure of compressor oil to the roof, take precautions to protect roofing.

Procedures which risk oil leakage include, but are not limited to, compressor replacement, repairing refrigerant leaks, replacing refrigerant components such as filter drier, pressure switch, metering device or coil.

Units are shipped with compressor mountings which are factory-adjusted and ready for operation.

CAUTION

Do not loosen compressor mounting bolts.

Phasing

Three-phase, scroll compressors operate in only one direction. If the scroll is drawing low amperage, has similar suction and discharge pressures, or is producing a high noise level, the scroll is misphased. Change the incoming line connection phasing to obtain the proper rotation.

CAUTION

Scroll compressors require proper rotation to operate properly. Failure to check and correct rotation may result in property damage.

Airflow Performance

Table 7: Side Duct Application

Model No. BHZ	Blower Speed Setting	External Static Pressure (Inches Water Gauge)														
		0.2			0.4			0.6			0.8			1.0		
		CFM	W	RPM	CFM	W	RPM	CFM	W	RPM	CFM	W	RPM	CFM	W	RPM
024 (2.0)	Low (1)	721	82	600	611	97	705	-	-	-	-	-	-	-	-	-
	Low/Medium (2)	769	93	628	694	112	730	610	126	832	-	-	-	-	-	-
	Medium (3)	882	131	704	812	147	797	736	162	889	651	177	979	-	-	-
	Medium/High (4)	971	171	773	916	188	857	851	205	939	775	219	1019	681	230	1097
	High (5)	-	-	-	-	-	-	957	249	982	887	261	1052	788	266	1120
030 (2.5)	Low (1)	828	110	673	759	125	771	-	-	-	-	-	-	-	-	-
	Low/Medium (2)	991	168	754	934	187	839	868	205	922	783	221	1003	-	-	-
	Medium (3)	1091	214	807	1041	234	883	983	253	958	910	269	1033	785	273	1106
	Medium/High (4)	1189	269	861	1144	288	927	1091	305	994	1027	318	1061	912	316	1132
	High (5)	-	-	-	1235	347	970	1186	360	1028	1125	368	1086	1007	352	1147
036 (3.0)	Low (1)	1025	158	769	906	175	856	-	-	-	-	-	-	-	-	-
	Low/Medium (2)	1214	237	764	1125	260	839	1034	283	913	942	307	987	-	-	-
	Medium (3)	1370	305	779	1276	330	846	1179	354	913	1078	377	981	971	397	1048
	Medium/High (4)	-	-	-	1416	413	872	1314	436	932	1206	454	993	1083	460	1051
	High (5)	-	-	-	-	-	-	1441	530	970	1326	538	1022	1182	521	1070
042 (3.5)	Low (1)	1241	221	702	1151	245	778	1058	268	853	-	-	-	-	-	-
	Low/Medium (2)	1406	299	759	1325	324	826	1242	349	893	1158	373	959	1072	396	1025
	Medium (3)	1536	376	808	1461	403	869	1384	427	928	1305	449	988	1223	468	1046
	Medium/High (4)	1656	466	858	1584	492	912	1509	515	966	1430	533	1019	1344	542	1070
	High (5)	-	-	-	1687	590	955	1611	610	1004	1527	620	1051	1428	615	1097
048 (4.0)	Low (1)	1342	249	717	1250	273	789	-	-	-	-	-	-	-	-	-
	Low/Medium (2)	1596	397	817	1513	422	875	1432	447	934	1354	474	995	1276	501	1058
	Medium (3)	1705	476	858	1624	501	911	1545	526	966	1466	549	1021	1386	571	1077
	Medium/High (4)	1806	561	895	1726	587	945	1646	610	995	1564	628	1046	1476	639	1096
	High (5)	1898	652	929	1819	679	977	1736	698	1023	1646	709	1069	1547	706	1112
060 (5.0)	Low (1)	1580	394	859	1504	420	917	-	-	-	-	-	-	-	-	-
	Low/Medium (2)	1614	419	874	1540	446	931	-	-	-	-	-	-	-	-	-
	Medium (3)	1733	508	924	1663	536	976	1588	559	1026	1501	572	1072	-	-	-
	Medium/High (4)	2003	737	1030	1922	746	1069	1829	746	1104	1712	728	1134	1528	659	1146
	High (5)	2214	968	1104	2089	918	1121	1949	859	1136	1785	787	1148	1576	689	1154

Table 8: Bottom Duct Application

Model No. BHZ	Blower Speed Setting	External Static Pressure (Inches Water Gauge)														
		0.2			0.4			0.6			0.8			1.0		
		CFM	W	RPM	CFM	W	RPM	CFM	W	RPM	CFM	W	RPM	CFM	W	RPM
024 (2.0)	Low (1)	721	82	600	611	97	705	-	-	-	-	-	-	-	-	-
	Low/Medium (2)	769	93	628	694	112	730	610	126	832	-	-	-	-	-	-
	Medium (3)	882	131	704	812	147	797	736	162	889	651	177	979	-	-	-
	Medium/High (4)	971	171	773	916	188	857	851	205	939	775	219	1019	681	230	1097
	High (5)	-	-	-	-	-	-	957	249	982	887	261	1052	788	266	1120
030 (2.5)	Low (1)	828	110	673	759	125	771	-	-	-	-	-	-	-	-	-
	Low/Medium (2)	991	168	754	934	187	839	868	205	922	783	221	1003	-	-	-
	Medium (3)	1091	214	807	1041	234	883	983	253	958	910	269	1033	785	273	1106
	Medium/High (4)	1189	269	861	1144	288	927	1091	305	994	1027	318	1061	912	316	1132
	High (5)	-	-	-	1235	347	970	1186	360	1028	1125	368	1086	1007	352	1147
036 (3.0)	Low (1)	1025	158	769	906	175	856	-	-	-	-	-	-	-	-	-
	Low/Medium (2)	1214	237	764	1125	260	839	1034	283	913	942	307	987	-	-	-
	Medium (3)	1370	305	779	1276	330	846	1179	354	913	1078	377	981	971	397	1048
	Medium/High (4)	-	-	-	1416	413	872	1314	436	932	1206	454	993	1083	460	1051
	High (5)	-	-	-	-	-	-	1441	530	970	1326	538	1022	1182	521	1070
042 (3.5)	Low (1)	1241	221	702	1151	245	778	1058	268	853	-	-	-	-	-	-
	Low/Medium (2)	1406	299	759	1325	324	826	1242	349	893	1158	373	959	1072	396	1025
	Medium (3)	1536	376	808	1461	403	869	1384	427	928	1305	449	988	1223	468	1046
	Medium/High (4)	1656	466	858	1584	492	912	1509	515	966	1430	533	1019	1344	542	1070
	High (5)	-	-	-	1687	590	955	1611	610	1004	1527	620	1051	1428	615	1097
048 (4.0)	Low (1)	1342	249	717	1250	273	789	-	-	-	-	-	-	-	-	-
	Low/Medium (2)	1596	397	817	1513	422	875	1432	447	934	1354	474	995	1276	501	1058
	Medium (3)	1705	476	858	1624	501	911	1545	526	966	1466	549	1021	1386	571	1077
	Medium/High (4)	1806	561	895	1726	587	945	1646	610	995	1564	628	1046	1476	639	1096
	High (5)	1898	652	929	1819	679	977	1736	698	1023	1646	709	1069	1547	706	1112
060 (5.0)	Low (1)	1580	394	859	1504	420	917	-	-	-	-	-	-	-	-	-
	Low/Medium (2)	1614	419	874	1540	446	931	-	-	-	-	-	-	-	-	-
	Medium (3)	1733	508	924	1663	536	976	1588	559	1026	1501	572	1072	-	-	-
	Medium/High (4)	2003	737	1030	1922	746	1069	1829	746	1104	1712	728	1134	1528	659	1146
	High (5)	2214	968	1104	2089	918	1121	1949	859	1136	1785	787	1148	1576	689	1154

Table 9: Additional Static Resistance

Size (Tons)	CFM	Wet Indoor Coil	Economizer ¹	Filter/Frame Kit	Electric Heat
024 (2.0)	500	0.01	0.00	0.01	0.02
	600	0.01	0.00	0.02	0.03
	700	0.01	0.00	0.02	0.03
	800	0.01	0.01	0.02	0.03
	900	0.01	0.01	0.02	0.04
	1000	0.02	0.01	0.02	0.04
	1100	0.03	0.01	0.03	0.05
	1200	0.04	0.02	0.03	0.06
030 (2.5)	700	0.01	0.00	0.02	0.03
	800	0.01	0.01	0.02	0.03
	900	0.01	0.01	0.02	0.04
	1000	0.02	0.01	0.02	0.04
	1100	0.03	0.01	0.03	0.05
	1200	0.04	0.02	0.03	0.06
	1300	0.07	0.03	0.17	-
036 (3.0)	700	0.01	0.00	0.02	0.03
	800	0.01	0.01	0.02	0.03
	900	0.01	0.01	0.02	0.04
	1000	0.02	0.01	0.02	0.04
	1100	0.03	0.01	0.03	0.05
	1200	0.04	0.02	0.03	0.06
	1300	0.04	0.03	0.03	0.07
	1400	0.04	0.04	0.03	0.08
042 (3.5)	1100	0.03	0.01	0.03	0.05
	1200	0.04	0.02	0.03	0.06
	1300	0.04	0.03	0.03	0.07
	1400	0.04	0.04	0.03	0.08
	1500	0.04	0.05	0.04	0.09
	1600	0.04	0.06	0.05	0.10
	1700	0.05	0.07	0.05	0.11
	1800	0.05	0.07	0.06	0.11
	1900	0.06	0.08	0.06	0.11
	2000	0.07	0.08	0.07	0.12
048 (4.0)	1100	0.03	0.01	0.03	0.05
	1200	0.04	0.02	0.03	0.06
	1300	0.04	0.03	0.03	0.07
	1400	0.04	0.04	0.03	0.08
	1500	0.04	0.05	0.04	0.09
	1600	0.04	0.06	0.05	0.10
	1700	0.05	0.07	0.05	0.11
	1800	0.05	0.07	0.06	0.11
	1900	0.06	0.08	0.06	0.11
	2000	0.07	0.08	0.07	0.12
060 (5.0)	1100	0.03	0.01	0.03	0.05
	1200	0.04	0.02	0.03	0.06
	1300	0.04	0.03	0.03	0.07
	1400	0.04	0.04	0.03	0.08
	1500	0.04	0.05	0.04	0.09
	1600	0.04	0.06	0.05	0.10
	1700	0.05	0.07	0.05	0.11
	1800	0.05	0.07	0.06	0.11
	1900	0.06	0.08	0.06	0.11
	2000	0.07	0.08	0.07	0.12

1. The pressure drop through the economizer is greater for 100% outdoor air than for 100% return air. If the resistance of the return air duct is less than 0.25 IWG, the unit will deliver less CFM during full economizer operation.

Table 10: Electric Heat Minimum Supply Air

Size (Tons)	Voltage	Minimum Supply Air (CFM)					
		Heater kW					
		5.0	7.5	10.0	15.0	20.0	25.0
024 (2.0)	208/230-1-60	630	630	800	-	-	-
030 (2.5)	208/230-1-60	630	630	800	800	-	-
	208/230-3-60	630	630	800	800	-	-
	460-3-60	630	630	800	800	-	-
036 (3.0)	208/230-1-60	1070	1070	1070	1070	-	-
	208/230-3-60	1070	1070	1070	1070	-	-
	460-3-60	1070	1070	1070	1070	-	-
042 (3.5)	208/230-1-60	1225	1225	1225	1225	-	-
	208/230-3-60	1225	1225	1225	1225	-	-
	460-3-60	1225	1225	1225	1225	-	-
048 (4.0)	208/230-1-60	-	-	1200	1430	1430	1430
	208/230-3-60	-	-	1200	1430	1430	1430
	460-3-60	-	-	1200	1430	1430	1430
060 (5.0)	208/230-1-60	-	-	1615	1615	1955	1955
	208/230-3-60	-	-	1615	1615	1955	1955
	460-3-60	-	-	1615	1615	1955	1955

Table 11: Indoor Blower Specifications

Size (Tons)	Motor				
	HP	RPM	Eff.	SF	Frame
024 (2.0)	1/2	Variable	0.8	1.0	48
030 (2.5)	1/2	Variable	0.8	1.0	48
036 (3.0)	3/4	Variable	0.8	1.0	48
042 (3.5)	3/4	Variable	0.8	1.0	48
048 (4.0)	3/4	Variable	0.8	1.0	48
060 (5.0)	1	Variable	0.8	1.0	48

Table 12: Electric Heat Multipliers

Voltage		kW Capacity Multipliers ¹
Nominal	Applied	
240	208	0.75
	230	0.92
480	460	0.92

1. Electric heaters are rated at nominal voltage. Use this table to determine the electric heat capacity for heaters applied at lower voltages.

Operation

Anti-short Cycle Timer

This unit has an anti-short cycle timer built in to the defrost control. This timer will not permit the compressor to start within five minutes after the completion of the last cycle or power interruption. To bypass the anti-short cycle feature, short the "TEST" pins together for 2 seconds.

The following sequences of operation are based on using a standard single-stage heat pump thermostat.

Cooling Sequence Of Operations

- When the fan switch on the thermostat is in the "ON" position, the 24 volts at "G" will bring on the indoor blower motor at the cooling airflow. When the fan switch on the thermostat is in the "AUTO" position, the blower operates only when there is a call for cooling by the thermostat.
- On a call for cooling, the thermostat sends 24 volts to "Y" and "O" on the fan control and defrost control boards. The reversing valve solenoid is energized, and after the anti-short cycle period is complete contactor coil M1 is energized. Power is supplied to the compressor and outdoor fan motor, and the reversing valve switched to the cooling position. When the fan switch on the thermostat is in the "AUTO" position the indoor blower motor is energized at the cooling airflow.

- When the demand for cooling has been satisfied, the 24 volt "Y" signal is removed, and the M1 contactor is de-energized. When the fan switch on the thermostat is in the "ON" position, the indoor blower motor continues to run. If the fan switch is in the "AUTO" position, the indoor motor ramps down over a 30-second period.

Heating Sequence Of Operations

- When the fan switch on the thermostat is in the "ON" position, the 24 volts at "G" brings on the indoor blower motor at the heating flow. When the fan switch on the thermostat is in the "AUTO" position, the blower operates when there is a call for heating by the thermostat.
- On a call for heating, the thermostat sends 24 volts to "Y" on the fan control board. After the anti-short cycle period is complete, the 24 volt signal energizes contactor coil M1 and power is supplied to the compressor and outdoor fan motor. The reversing valve remains in the heating position. When the fan switch on the thermostat is in the "AUTO" position, the indoor blower is energized at the heating airflow.
- For units equipped with supplementary electric heat, when the heat pump cannot meet the demand, the thermostat "W" sends 24 volts to "W2" on the fan control board. This signal also is sent through the defrost control terminals "W" and "W6" and back to the fan control "W1". The 24 volt signal energizes all stages of electric heat.
- When the heating demand is satisfied, the electric heat is de-energized when the 24 volt "W" signal is removed, and the M1 contactor is de-energized when the 24 volt "Y" signal is removed. When the fan switch on the thermostat is in the "ON" position, the indoor blower continues to run. When the fan switch is in the "AUTO" position, the indoor blower motor ramps down over a 15-second period.

Please refer to Tables 13 and 14 for more information.

Defrost Operation

The demand defrost control implements a temperature differential ("delta-T") demand defrost algorithm. The heat pump is allowed to operate in the heating mode until the combination of outdoor ambient and outdoor coil temperatures indicate that defrosting is necessary. When coil temperature is below the initiate point for the ambient temperature continuously for 4-1/2 minutes, the heat pump is put into a defrost cycle. This 4-1/2 minute timer eliminates unnecessary defrost cycles caused by refrigeration surges such as those that occur at the start of a heating cycle.

A timed inhibit feature prevents the system from responding to a call for defrost less than 20 minutes after the initiation of

the previous defrost. After the 20 minute inhibit time has expired, temperature conditions must call for defrost continuously for 4-1/2 minutes before a defrost cycle is initiated. A temperature inhibit feature prohibits defrost if the coil temperature is above 40°F.

A forced-defrost feature puts the system into a defrost period every 6 hours and 4 minutes to recirculate lubricants, unless the coil temperature is above 40°F. All defrost timing occurs only while the compressor is on.

During the defrost mode, the defrost control will provide a 24 volt signal from terminal "W1/66" to the fan control terminal "W1". This signal will energize electric heat stage 1, if the unit is so equipped.

For trouble shooting purposes, the defrost cycle can be manually initiated by shorting the "TEST" pins together for 5 seconds.

Defrost will terminate normally during the "TEST" mode.

Heat Pump Safety Switch Operation

The unit is equipped with a safety package. The refrigeration system will be protected against high or low refrigerant pressure. If either of these safety switches opens, the unit will be shut off for the 5 minute anti-short cycle time. Once this has expired, a six hour elapsed run timer begins. If a second opening of a safety switch occurs during this six hour period, the compressor will be locked out.

Resetting the lockout function is accomplished by:

- Removing power from the control's thermostat 1st stage (Y) input for a time not to exceed 5 seconds (ON-OFF-ON).
- Removing power from "R" for more than 2 seconds.
- Shorting the "TEST" pins together for more than 2 seconds.

Electric Heat Limit Switch Operation

The limit switch responds to over temperature conditions in the air duct. Opening of the device results in dropping power to the relays. The control logic will also respond by turning off the relays. After four limit cycle trips the unit goes into a 1 hour soft lockout period. If during this period the control "sees" another limit cycle, the unit will go into a hard lockout condition. Once in a hard lockout state, the fan is locked on and the heaters are disabled. Only a power cycle will clear this state.

During the soft lockout period, the fan responds to thermostat input but the heaters are enabled. This is to sense a failed heater relay. The limit cycle count is reset at the start of a heat request. If the limit remains open for period of 80 seconds or more, the control is immediately put into a hard lockout condition. Only a power cycle will clear this state.

Table 13: Thermostat Signals (Single Phase Units)

Signal	State	Board Function
G	ON	FAN INSTANT ON
	OFF	FAN INSTANT OFF
G & Y & O	ON	FAN INSTANT ON COMPRESSOR AND OUTDOOR FAN INSTANT ON (AFTER ANTI-SHORT CYCLE DELAY) REVERSING VALVE ENERGIZED SYSTEM OPERATES IN COOLING
	OFF	COMPRESSOR AND OUTDOOR FAN INSTANT OFF FAN 60 SEC. DELAY OFF
G & Y	ON	FAN INSTANT ON COMPRESSOR AND OUTDOOR FAN INSTANT ON (AFTER ANTI-SHORT CYCLE DELAY) SYSTEM OPERATES IN HEATING
	OFF	COMPRESSOR AND OUTDOOR FAN INSTANT OFF FAN 60 SEC. DELAY OFF
G & W	ON	FAN INSTANT ON HEATER BANK 1 ELEC. HEAT INSTANT ON HEATER BANK 2 ELEC. HEAT 10 SEC. DELAY ON HEATER BANK 3 ELEC. HEAT 20 SEC. DELAY ON
	OFF	HEATER BANK 3 ELEC. HEAT INSTANT OFF FAN INSTANT ON FAN INSTANT OFF FAN INSTANT ON
G & Y & W	ON	COMPRESSOR AND OUTDOOR FAN INSTANT ON (AFTER ANTI-SHORT CYCLE DELAY) REVERSING VALVE ENERGIZED SYSTEM OPERATES IN COOLING COMPRESSOR AND OUTDOOR FAN INSTANT OFF FAN 60 SEC. DELAY OFF FAN INSTANT ON
	OFF	COMPRESSOR AND OUTDOOR FAN INSTANT ON (AFTER ANTI-SHORT CYCLE DELAY) SYSTEM OPERATES IN HEATING COMPRESSOR AND OUTDOOR FAN INSTANT OFF FAN 60 SEC. DELAY OFF FAN INSTANT ON
W	ON	HEATER BANK 1 ELEC. HEAT INSTANT ON HEATER BANK 2 ELEC. HEAT 10 SEC. DELAY ON HEATER BANK 3 ELEC. HEAT 20 SEC. DELAY ON HEATER BANK 3 ELEC. HEAT INSTANT OFF
	OFF	FAN INSTANT ON FAN INSTANT OFF FAN INSTANT ON COMPRESSOR AND OUTDOOR FAN INSTANT ON (AFTER ANTI-SHORT CYCLE DELAY)

Table 14: Thermostat Signals (Three Phase Units)

Signal	State	Board Function
G	ON	FAN INSTANT ON
	OFF	FAN INSTANT OFF
G & Y & O	ON	FAN INSTANT ON COMPRESSOR AND OUTDOOR FAN INSTANT ON (AFTER ANTI-SHORT CYCLE DELAY) REVERSING VALVE ENERGIZED SYSTEM OPERATES IN COOLING
	OFF	COMPRESSOR AND OUTDOOR FAN INSTANT OFF FAN 60 SEC. DELAY OFF
G & Y	ON	FAN INSTANT ON COMPRESSOR AND OUTDOOR FAN INSTANT ON (AFTER ANTI-SHORT CYCLE DELAY) SYSTEM OPERATES IN HEATING
	OFF	COMPRESSOR AND OUTDOOR FAN INSTANT OFF FAN 60 SEC. DELAY OFF

Table 14: Thermostat Signals (Three Phase Units) (Continued)

Signal	State	Board Function
G & W	ON	FAN INSTANT ON HEATER BANK 1, 2 & 3 ELEC. HEAT INSTANT ON HEATER BANK 4, 5 & 6 ELEC. HEAT 10 SEC. DELAY ON
	OFF	HEATER BANK 4, 5 & 6 ELEC. HEAT INSTANT OFF HEATER BANK 1, 2 & 3 ELEC. HEAT SEC. DELAY OFF FAN 10 SEC. DELAY OFF
G & Y & W	ON	FAN INSTANT ON COMPRESSOR AND OUTDOOR FAN INSTANT ON SYSTEM OPERATES IN HEATING HEATER BANK 1, 2 & 3 ELEC. HEAT INSTANT ON HEATER BANK 4, 5 & 6 ELEC. HEAT 10 SEC. DELAY ON
	OFF	COMPRESSOR AND OUTDOOR FAN INSTANT OFF HEATER BANK 4, 5 & 6 ELEC. HEAT INSTANT OFF HEATER BANK 1, 2 & 3 ELEC. HEAT SEC. DELAY OFF FAN 60 SEC. DELAY OFF
W	ON	FAN INSTANT ON HEATER BANK 1, 2 & 3 ELEC. HEAT INSTANT ON HEATER BANK 4, 5 & 6 ELEC. HEAT 10 SEC. DELAY ON
	OFF	HEATER BANK 4, 5 & 6 ELEC. HEAT INSTANT OFF HEATER BANK 1, 2 & 3 ELEC. HEAT SEC. DELAY OFF FAN 10 SEC. DELAY OFF

Maintenance

Normal Maintenance

WARNING

Prior to any of the following maintenance procedures, shut off all power to the unit, to avoid personal injury.

Periodic maintenance consists of changing or cleaning filters and general cleaning of the outdoor coil.

FILTERS - Inspect once a month. Replace Disposable or clean Permanent Type as necessary. DO NOT replace Permanent Type with Disposable.

MOTORS - Indoor and outdoor fan motors are permanently lubricated and require no maintenance.

OUTDOOR COIL - Dirt should not be allowed to accumulate on the outdoor coil surface or other parts in the air circuit. Cleaning should be as often as necessary to keep the coil clean. Use a brush, vacuum cleaner attachment, or other suitable means. If water is used to clean the coil, be sure that the power to the unit is shut off prior to cleaning.

CAUTION

Exercise care when cleaning the coil so that the coil fins are not damaged.

Do not permit the hot condenser air discharge to be obstructed by overhanging structures or shrubs.

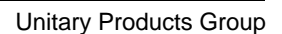
Troubleshooting

WARNING

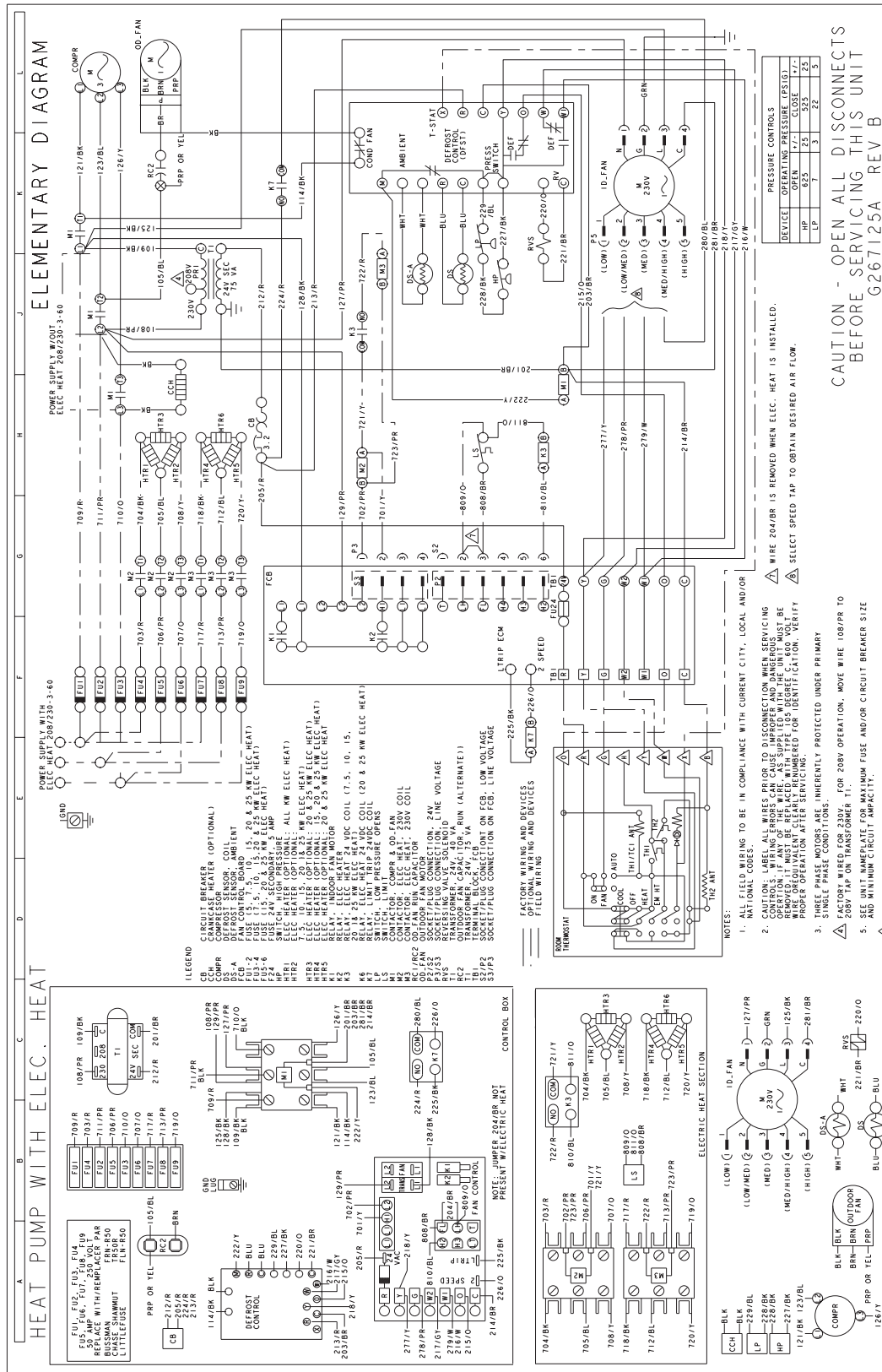
Troubleshooting of components necessarily requires opening the electrical control box with the power connected to the unit. Use extreme care when working with live circuit! Check the unit nameplate for the correct range before making any connections with line terminals.

CAUTION

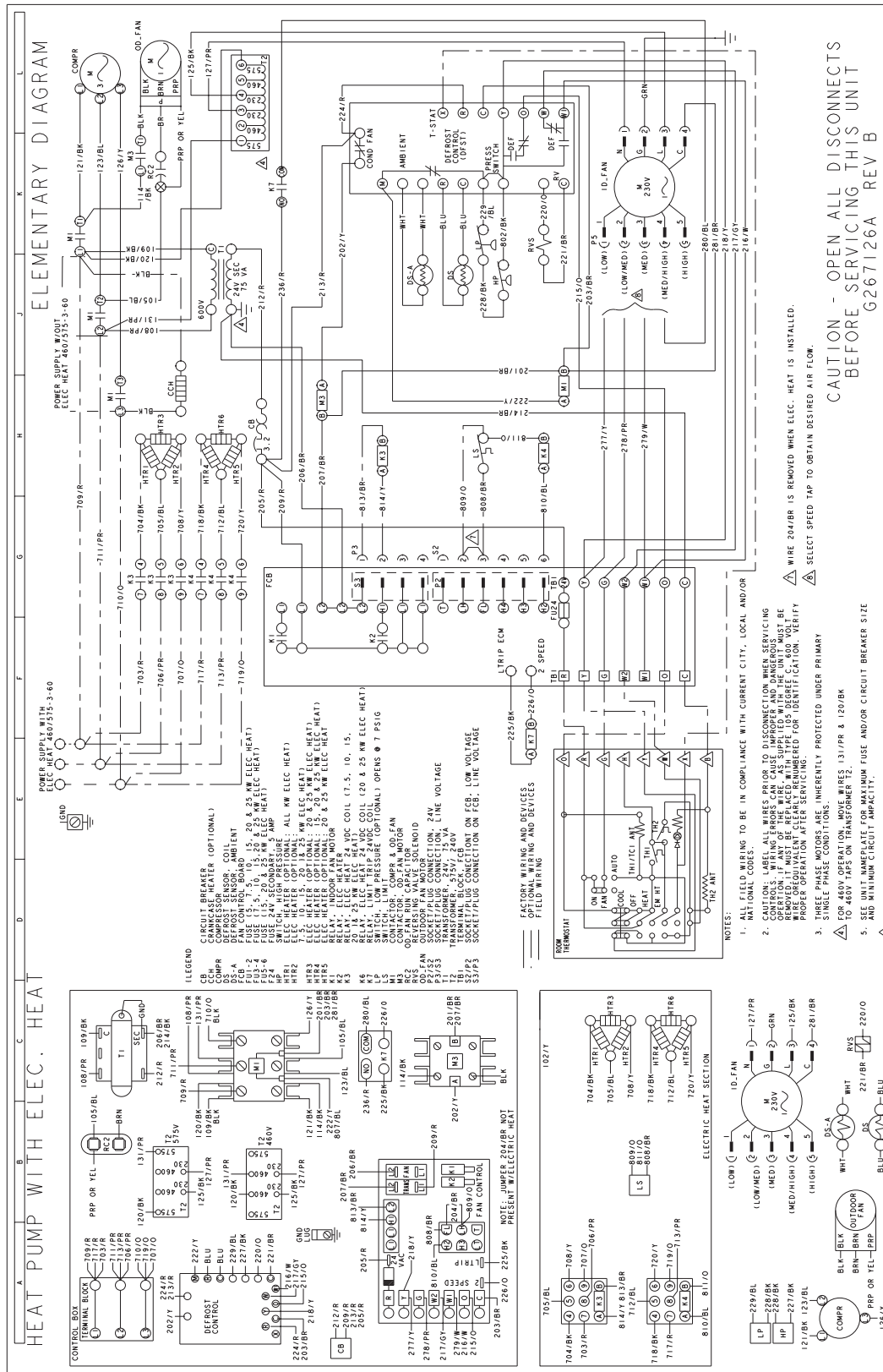
The wire number or color and terminal designations referred to may vary. Check the wiring label inside the control box access panel for the correct wiring.



Typical BHZ030-060 Heat Pump 230-3-60 volt Wiring Diagram



Typical BHZ030-060 Heat Pump 460-3-60 volt Wiring Diagram



R-410A QUICK REFERENCE GUIDE

Refer to Installation Instructions for specific installation requirements.

- R-410A Refrigerant operates at 50 - 70 percent higher pressures than R-22. Be sure that servicing equipment and replacement components are designed to operate with R-410A.
- R-410A Refrigerant cylinders are rose colored.
- Recovery cylinder service pressure rating must be 400 psig, DOT 4BA400, or DOT BW400.
- Recovery equipment must be rated for R-410A.
- **Do Not** use R-410A service equipment on R-22 systems. All hoses, gages, recovery cylinders, charging cylinders and recovery equipment must be dedicated for use on R-410A systems only.
- Manifold sets must be at least 700 psig high side, and 180 psig low side, with 550 psig retard.
- All hoses must have a service pressure rating of 800 psig.
- Leak detectors must be designed to detect HFC refrigerants.
- Systems must be charged with liquid refrigerant. Use a commercial type metering device in the manifold hose.
- R-410A can only be used with POE type oils.
- POE type oils rapidly absorb moisture from the atmosphere.
- Vacuum pumps will **not** remove moisture from POE type oils.
- **Do not** use liquid line driers with a rated working pressure rating less than 600 psig.
- **Do not** install suction line driers in the liquid line.
- A liquid line drier is required on every unit.
- **Do not** use a R-22 TXV. If a TXV is to be used, it must be a R-410A TXV.
- Never open system to atmosphere when under a vacuum.
- If system must be opened for service, evacuate system then break the vacuum with dry nitrogen and replace all filter driers.

Figure 9: R-410A Quick Reference Guide

